

strength” are equal in scope. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

### **§102 Rejections**

Claims 18-21 and 25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Curtis (U.S. Pat. No. 5,238,558). For the reasons set forth below, this ground of rejection is respectfully traversed.

The present invention is a magnet apparatus for treating liquids passing through a pipe. In a first embodiment, the present invention comprises a magnet apparatus 112 which includes at least three magnets 230, 240, 250 with horizontally-oriented poles, and at least two magnets 235, 245 with vertically-oriented poles disposed within a housing 200. The respective magnets are arranged so that one of the three magnets 230, 240, 250 is disposed between the at least two magnets 235, 245. The magnet apparatus 112 also includes first and second pole structures 210, 220 which are coupled to the magnets 230, 235, 240, 245, and 250. In a second embodiment, the present invention comprises a magnetic apparatus 320 including a pipe 310 with a housing 321 arranged circumferentially thereabout. The housing 321 includes at least two magnetic structures 330, 340 disposed on opposing sides of the pipe 310. The magnetic structures 330, 340 each include at least two magnets with vertically-oriented poles arranged on either side of a magnet with horizontally-oriented poles.

By utilizing the particular arrangements of magnets and pole pieces shown in Figures 2 and 5 of the present application, the Applicant has discovered that a magnetic field can be generated which extends much further into a respective pipe than the magnetic fields generated by most conventional magnetic treatment systems. By increasing the ‘reach’ of the magnetic field, more particles disposed in the fluid in the pipe can be affected, and thus a more efficient treatment system can be achieved.

Curtis teaches a magneto-hydrodynamic fluid treatment system which includes a plurality of magnet units 12 disposed around a fluid-carrying pipe 14. Figure 3 shows the particular

structure of the magnets units 12. Each magnet unit 12 includes a two magnets 18 which have vertically-oriented poles, two magnets 19 which have horizontally-oriented poles, and two cylindrical magnets 27 which have vertically-oriented poles.

Curtis fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing (emphasis added). Figures 5 and 6 of the present application shows such a structure.

Claim 18 recites:

A magnetic apparatus comprising: a housing with a recess formed therein for receiving a pipe; a first magnet structure disposed in the housing, said first magnet structure comprising a first magnet with its poles disposed orthogonal to the recess, a second magnet with its poles disposed parallel to the recess, and a third magnet with its poles disposed orthogonal to the recess; and, a second magnet structure disposed in the housing, said second magnet structure comprising a first magnet with its poles disposed orthogonal to the recess, a second magnet with its poles disposed parallel to the recess, and a third magnet with its poles disposed orthogonal to the recess. [emphasis added].

Thus, claim 18 requires a housing with a recess for receiving a pipe with two magnet structures disposed therein, where each of the magnet structures have two magnets with vertically-oriented poles and one magnet with horizontally-oriented poles. The only figure of Curtis which arguably shows a housing with a recess formed therein for receiving a pipe is Figure 5. However, there is only one magnet structure disposed in the housing shown in Figure 5 which consists of five magnets arranged so that two vertically-oriented magnets are disposed on opposite sides of a horizontally-oriented magnet. Since Curtis fails to disclose or suggest a housing with a recess and multiple magnet structures (such as those described in claim 18), reconsideration and withdrawal of this ground of rejection is respectfully requested.

Claims 1, 2, 5-7, 9, 10, 18, 27, 29 and 30 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Patterson (U.S. Pat. No. 6,171,504). For the reasons set forth below, this ground of rejection is respectfully traversed.

Independent claim 4 now recites:

A magnet apparatus comprising: a housing with at least two side walls, and top and bottom walls connecting the side walls; at least two first magnets disposed with their poles orthogonal to the bottom wall of the housing; at least three second magnets disposed with their poles parallel to the bottom wall of the housing, one of said at least three second magnets being disposed between the at least two first magnets; a first pole structure extending along both sidewalls and the top wall of the housing; and, a second pole structure extending between the at least two first magnets.

Thus, claim 3 requires a magnet apparatus which includes three (3) magnets 230, 240, 250 with horizontally-oriented poles and two magnets with vertically-oriented poles 235, 245, wherein at least one of the horizontal pole magnets (e.g., 240) is disposed between the two vertical pole magnets, and first and second pole structures 210, 220 coupled between some of the magnets (See Fig.2 of the present application). The pole structures 210, 220 assist in forming the magnetic field generated by the magnets 230, 235, 240, 245, and 250.

Patterson teaches fluid treatment device (Figs. 1 and 2) which includes two magnets 10, 12 with vertically-oriented poles disposed on either side of a magnet 14 with horizontally-oriented poles. Patterson discusses, but does not depict in the drawings, an alternative embodiment where two additional magnets with vertically-oriented poles are disposed next to the vertically-oriented magnets 10,12 shown in Figures 1 and 2.

Patterson fails to disclose or suggest a magnet apparatus which includes three (3) magnets with horizontally-oriented poles and two magnets with vertically-oriented poles, wherein at least one of the horizontal pole magnets is disposed between the two vertical pole magnets, and first and second pole structures 210, 220 coupled between some of the magnets (See Fig.2 of the present application). Patterson specifically does not disclose or suggest a magnet apparatus including "at least three" magnets with horizontally-oriented poles, nor does Patterson disclose or suggest pole structures interconnecting the magnets. Therefore, reconsideration and withdrawal of this ground of rejection with respect to claims 1-10 is respectfully requested.

Independent claim 11 has been canceled in favor of new independent claim 14, which includes all the limitations discussed above with reference to claim 4. Therefore, reconsideration and withdrawal of this ground of rejection with respect to claims 11-16 is respectfully requested.

Independent claim 18 recites a magnet apparatus as shown in Figure 5 of the present application which includes a housing with a recess therein for receiving a pipe, and at least two magnet structures disposed within the housing. Each of the magnet structures recited in claim 18 include two magnets with vertically-oriented poles and one magnet with horizontally-oriented poles.

Since Patterson fails to disclose or suggest a housing with a recess for receiving a pipe, or the magnet arrangement shown in Figure 5 of the present application, reconsideration and withdrawal of this ground of rejection with respect to claims 18-26 is respectfully requested.

Independent claim 27 has been amended to include all the limitations discussed above with reference to claim 4. Therefore, reconsideration and withdrawal of this ground of rejection with respect to claims 27-29 is respectfully requested.

Independent claim 30 has been canceled in favor of new independent claim 32, which includes all the limitations discussed above with reference to claim 4. Therefore, reconsideration and withdrawal of this ground of rejection with respect to claims 31-34 is respectfully requested.

### **§103 Rejections**

Claims 3, 4, 11-16, 28 and 30-34 stand rejected under 35 U.S.C. § 103(a) as being obvious over Patterson in view of Curtis and Glass (U.S. Pat. No. 6,056,872). For the reasons set forth below, this ground of rejection is respectfully traversed.

As discussed above with reference to claims 1, 2, 5-7, 9, 10, 18, 27, 29 and 30, Patterson fails to disclose or suggest the particular magnet structures recited in independent claims 4, 14, 18, 27 and 32 (and shown in Figures 2 and 5 of the present application). Neither Curtis nor Glass can rectify the deficiencies of the Patterson reference.

As discussed above, Curtis teaches a magneto-hydrodynamic fluid treatment system which includes a plurality of magnet units 12 disposed around a fluid-carrying pipe 14. Each magnet unit 12 includes a two magnets 18 which have vertically-oriented poles, two magnets 19 which have horizontally-oriented poles, and two cylindrical magnets 27 which have vertically-oriented poles. Curtis fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing (See Fig. 5 of the present application). Curtis also fails to disclose or suggest a magnet apparatus which includes three (3) magnets with horizontally-oriented poles and two magnets with vertically-oriented poles, wherein at least one of the horizontal pole magnets is disposed between the two vertical pole magnets (See Fig.2 of the present application).

Glass teaches a magnetic treatment device comprised of magnets surrounding a liquid-carrying pipe. Glass notes that the use of a backplate 6, 8 with the magnets can increase the penetration of the magnetic field into the pipe (Figs. 7 and 8; col.13, lines 17-19). Glass fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing. Glass also fails to disclose or suggest a magnet apparatus which includes three (3) magnets with horizontally-oriented poles and two magnets with vertically-oriented poles, wherein at least one of the horizontal pole magnets is disposed between the two vertical pole magnets.

Thus, since none of Patterson, Curtis or Glass disclose or suggest the invention as recited in independent claims 4, 14, 18, 27 and 32, reconsideration and withdrawal of this ground of rejection is requested with respect to claims 3, 4, 11-16, 28 and 30-34.

Claims 22-24 stand rejected under 35 U.S.C. § 103(a) as being obvious over Curtis in view of Hamano et al. (U.S. Pat. No. 5,872,501). For the reasons set forth below, this ground of rejection is respectfully traversed.

As stated above with reference to claim 18 and the Curtis reference, Curtis fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe”

with first and second specific magnet structures disposed within the housing. Hamano also fails to disclose or suggest such an invention.

Hamano teaches a magnet structure formed of rare earth elements, such as Neodymium. Hamano fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing, as recited in claim 18 (upon which claims 22-24 depend).

Thus, since neither Curtis nor Hamano disclose or suggest the invention as recited in independent claim 18, reconsideration and withdrawal of this ground of rejection is requested with respect to claims 22-24.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being obvious over Patterson in view of Hamano et al. For the reasons set forth below, this ground of rejection is respectfully traversed.

As discussed above, Patterson teaches fluid treatment device which includes two magnets 10, 12 with vertically-oriented poles disposed on either side of a magnet 14 with horizontally-oriented poles. Patterson fails to disclose or suggest a magnet apparatus which includes three (3) magnets with horizontally-oriented poles and two magnets with vertically-oriented poles, wherein at least one of the horizontal pole magnets is disposed between the two vertical pole magnets, as recited in independent claim 1 (upon which claim 8 depends).

As stated above, Hamano teaches a magnet structure formed of rare earth elements, such as Neodymium. Hamano fails to disclose or suggest a magnet apparatus which includes three (3) magnets with horizontally-oriented poles and two magnets with vertically-oriented poles, wherein at least one of the horizontal pole magnets is disposed between the two vertical pole magnets, as recited in independent claim 1 (upon which claim 8 depends).

Thus, since neither Patterson nor Hamano disclose or suggest the invention as recited in independent claim 1, reconsideration and withdrawal of this ground of rejection is requested with respect to claim 8.

Claim 26 stand rejected under 35 U.S.C. § 103(a) as being obvious over Curtis in view of Glass. For the reasons set forth below, this ground of rejection is respectfully traversed.

As discussed above, Curtis teaches a magneto-hydrodynamic fluid treatment system which includes a plurality of magnet units 12 disposed around a fluid-carrying pipe 14. Curtis fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing, as recited in claim 18 (upon which claim 26 depends)

Glass teaches a magnetic treatment device comprised of magnets surrounding a liquid-carrying pipe. Glass fails to disclose or suggest an apparatus which includes a housing with a “recess for receiving a pipe” with first and second magnet structures disposed within the housing, as recited in claim 18 (upon which claim 26 depends).

Thus, since neither Curtis nor Glass disclose or suggest the invention as recited in independent claim 18, reconsideration and withdrawal of this ground of rejection is requested with respect to claim 26.

In view of the foregoing remarks and amendments, Applicants submit that this application is in condition for allowance at an early date, which action is earnestly solicited.


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Respectfully submitted,

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**Version With Markings to Show Changes Made**

2. (Amended) The magnet apparatus of claim 4[1], wherein the at least two first magnets and the at least three second magnets all abut the bottom wall of the housing.

4. (Amended) A magnet apparatus comprising:

a housing with at least two side walls, and top and bottom walls connecting the side walls;

at least two first magnets disposed with their poles orthogonal to the bottom wall of the housing;

at least three second magnets disposed with their poles parallel to the bottom wall of the housing, one of said at least three second magnets being disposed between the at least two first magnets;

a first pole structure extending along both sidewalls and the top wall of the housing;  
and, [The magnet apparatus of claim 3, further comprising:]

a second pole structure extending between the at least two first magnets.

5. (Amended) The magnet apparatus of claim 4[1], wherein a north pole of one of the at least two first magnets abuts the bottom wall of the housing, and a south pole of the other of the at least two first magnets abuts the bottom wall of the housing.

6. (Unchanged) The magnet apparatus of claim 5, wherein south poles of two of the at least three second magnets abut the south pole of the other of the at least two first magnets, and a north pole of a third of the at least three second magnets abuts the north pole of the one of the at least two first magnets.

7. (Amended) The magnet apparatus of claim 4[1], wherein the at least two first magnets are of the same magnetic strength and the at least three second magnets are of the same magnetic strength.

8. (Amended) The magnet apparatus of claim 4[1], wherein the at least two first magnets and the at least three second magnets are made at least partially of a rare earth trivalent element.

9. (Amended) The magnet apparatus of claim 4[1], wherein the at least two first magnets and the at least three second magnets are made at least partially of Neodymium.

10. (Amended) The magnet apparatus of claim 4[1], wherein the at least two first magnets and the at least three second magnets are made at least partially of Neodymium, Boron and Iron.

12. (Amended) The magnet apparatus of claim 14[11], wherein the first and second side walls and the top wall are made of ferromagnetic metals.

13. (Amended) The magnet apparatus of claim 14[11], further comprising:  
a housing, wherein the first pole structure, the at least one first magnet, the at least one second magnet, the at least one third magnet, the at least one fourth magnet, and the at least one fifth magnet are disposed within the housing.

14. (Amended) A magnet apparatus comprising:  
a first pole structure having first and second parallel sidewalls and a top wall connecting the pair of sidewalls;  
at least one first magnet disposed with its poles parallel to the top wall, and so that its north pole abuts the first sidewall;  
at least one second magnet disposed with its poles orthogonal to the top wall, and so that its south pole abuts a south pole of the at least one first magnet;  
at least one third magnet disposed with its poles parallel to the top wall, and so that its south pole abuts the south pole of the at least one second magnet;  
at least one fourth magnet disposed with its poles orthogonal to the top wall, and so that its north pole abuts a north pole of the at least one third magnet;  
at least one fifth magnet disposed with its poles orthogonal to the top wall, and so that its south pole abuts the second sidewall; and,[The magnet apparatus of claim 11, further comprising:]  
a second pole structure coupling the north pole of the at least one second magnet to a south pole of the at least one fourth magnet.

15. (Unchanged) The magnet apparatus of claim 14, wherein the first and second side walls, the top wall, and the second pole structure are made of ferromagnetic metal.

16. (Unchanged) The magnet apparatus of claim 14, further comprising:  
a housing, wherein the first pole structure, the second pole structure, the at least one first magnet, the at least one second magnet, the at least one third magnet, the at least one fourth magnet, and the at least one fifth magnet are disposed within the housing.

18. (Unchanged) A magnetic apparatus comprising:  
a housing with a recess formed therein for receiving a pipe;  
a first magnet structure disposed in the housing, said first magnet structure comprising a first magnet with its poles disposed orthogonal to the recess, a second magnet with its poles disposed parallel to the recess, and a third magnet with its poles disposed orthogonal to the recess; and,  
a second magnet structure disposed in the housing, said second magnet structure comprising a first magnet with its poles disposed orthogonal to the recess, a second magnet with its poles disposed parallel to the recess, and a third magnet with its poles disposed orthogonal to the recess.

19. (Unchanged) The magnetic apparatus of claim 18, further comprising:  
a pipe disposed in the recess, wherein the first and second magnetic structures are disposed on opposite sides of the pipe.
20. (Unchanged) The magnetic apparatus of claim 18, wherein the first magnet of the first magnet structure has its south pole abutting the recess, the second magnet of the first magnet structure has its south pole abutting the first magnet of the first magnet structure, and the third magnet of the first magnet structure has its north pole abutting the recess.
21. (Unchanged) The magnetic apparatus of claim 20, wherein the first magnet of the second magnet structure has its south pole abutting the recess, the second magnet of the second magnet structure has its south pole abutting the first magnet of the second magnet structure, and the third magnet of the second magnet structure has its north pole abutting the recess.
22. (Unchanged) The magnetic apparatus of claim 18, wherein the first, second and third magnets of the first magnet structure and the first, second and third magnets of the second magnet structure are made at least partially of a rare earth trivalent element.
23. (Unchanged) The magnet apparatus of claim 18, wherein the first, second and third magnets of the first magnet structure and the first, second and third magnets of the second magnet structure are made at least partially of Neodymium.
24. (Unchanged) The magnet apparatus of claim 18, wherein the first, second and third magnets of the first magnet structure and the first, second and third magnets of the second magnet structure are made at least partially of Neodymium, Boron and Iron.
25. (Unchanged) The magnetic apparatus of claim 18, wherein the first, second and third magnets of the first magnet structure and the first, second and third magnets of the second magnet structure are all of a first magnetic power.
26. (Unchanged) The magnetic apparatus of claim 18, wherein the first and third magnets of the first magnet structure and the first and third magnets of the second magnet structure are of a first magnetic power, and the second magnet of the first magnet structure and the second magnet of the second magnet structure are of a second magnetic power, said first magnetic power being greater than said second magnetic power.
27. (Amended) A magnetic treatment system comprising:  
a pipe for carrying fluid or gas; and,  
a magnet apparatus comprising a housing with at least two side walls, and top and bottom walls connecting the side walls; at least two first magnets disposed with their poles orthogonal to the bottom wall of the housing; [and] at least three second magnets disposed with their poles

parallel to the bottom wall of the housing, a first pole structure extending along the at least two sidewalls and the top wall of the housing, and a second pole structure extending between the at least two first magnets, wherein one of said at least three second magnets being disposed between the at least two first magnets.

28. (Unchanged) The magnetic treatment system of claim 27, wherein a magnetic flux generated by the magnet apparatus extends substantially to central axis of the pipe.

29. (Unchanged) The magnetic treatment system of claim 27, wherein the at least two first magnets are of the same magnetic strength and the at least three second magnets are of the same magnetic strength.

31. (Amended) The magnetic treatment system of claim 32[30], wherein the first and second side walls and the top wall of the magnet apparatus are made of ferromagnetic metal.

32. (Amended) A magnetic treatment system comprising:

a pipe for carrying fluid or gas; and,

a magnet apparatus comprising a first pole structure having first and second parallel sidewalls and a top wall connecting the pair of sidewalls; at least one first magnet disposed parallel to the top wall, and so that its north pole abuts the first sidewall; at least one second magnet disposed perpendicular to the top wall, and so that its south pole abuts a south pole of the at least one first magnet; at least one third magnet disposed parallel to the top wall, and so that its south pole abuts the south pole of the at least one second magnet; at least one fourth magnet disposed perpendicular to the top wall, and so that its north pole abuts a north pole of the at least one third magnet; at least one fifth magnet disposed parallel to the top wall, and so that its south pole abuts the second sidewall; and, [The magnetic treatment system of claim 30, further comprising:]

a second pole structure coupling the north pole of the at least one second magnet to a south pole of the at least one fourth magnet.

33. (Unchanged) The magnetic treatment system of claim 32, wherein the first and second side walls, the top wall, and the second pole structure of the magnet apparatus are made of ferromagnetic metal.

34. (Amended) The magnetic treatment system of claim 32[30], wherein a magnetic flux generated by the magnet apparatus extends substantially to central axis of the pipe.